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REGULATION OF SURFACE MINING AND
RECLAMATION FOR MINERALS OTHER THAN COAL

A Report to the President and the Congress,
pursuant to Section 709 of the Surface
Mining Control and Reclamation Act of
1977.

Council on Environmental Quality
Washington, D.C.
May 1981

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I. Introduction

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) states that its purpose is to establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations."^{1/} Although the Act authorized the establishment of environmental performance standards, land-use planning programs and regulatory mechanisms to control coal operations, Congress recognized that there were problems associated with non-coal operations which would require attention in the near future; the Act states: "while there is a need to regulate surface mining operations for minerals other than coal, more data and analyses are needed to serve as a basis for effective and reasonable regulation of such operations."^{2/}

Therefore Congress, in Section 709 of the Act, directed the Chairman of the Council on Environmental Quality (CEQ) to contract for "an in-depth study of current and developing technology for surface and open pit mining and reclamation for minerals other than coal, designed to assist in the establishment of effective and reasonable regulation of surface and open pit mining and reclamation for minerals other than coal" (Sec. 709(a)).^{3/} The results of this study and additional information were to be used by the Council in preparing a report and recommendations for the President and Congress.

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The Council contracted with the National Academy of Sciences for the study. The National Research Council, the operating arm of the Academy, formed the Committee on Surface Mining and Reclamation (COSMAR) to conduct this study and to provide the Council with a report evaluating the extent to which the requirements of SMCRA for coal mining and reclamation could be applied to minerals other than coal. The COSMAR report contains scientific and technical evaluations of the environmental effects and the economic costs and feasibility of current and developing technology for non-coal surface mining and reclamation.

COSMAR organized nine panels to prepare working papers which focused on the economic and environmental conditions associated with mining methods for commodities found in different geologic, climatic, geomorphic and cultural settings. Each panel conducted field trips and obtained information from government agencies, the industry, academic institutions, environmental organizations and interested members of the public.

II. The COSMAR Report

The National Academy of Sciences submitted the COSMAR report, Surface Mining of Non-Coal Minerals - A Study of Mineral Mining From the Perspective of the Surface Mining

Control and Reclamation Act of 1977, to the Council in November, 1979. COSMAR responded to the specific charges in Section 709 and found:

"(1) that the degree to which the requirements of the Act can be met by existing or developing technology ranges from readily achievable to impractical depending on specific requirements and on the location and nature of the mineral deposit and method of mining and processing; when existing or projected data made it possible, compliance costs were ascertained or estimated;

"(2) that there are areas where the requirements of the Act cannot be met because of technological or economic limitations;

"(3) that in those instances where the requirements of the Act cannot be met, COSMAR identified requirements most comparable to those of the Act that could be met, described the differences between these requirements and those of the Act, and estimated costs when estimates are feasible;

"(4) that there are alternative regulatory mechanisms, and institutional approaches not regulatory in character, that could ensure the achievement of the most beneficial postmining land use for areas affected by surface and open pit mining; these alternatives were identified and their applicability to a range of requirements and situations was discussed."^{4/}

An outline of some of the more important specific COSMAR findings follows:

A. Mineral Diversity

1. non-coal mineral mines can be divided into two major groups: small ubiquitous units (sand, gravel, and other construction materials) and large mining operations confined to specific geographic regions (e.g., phosphate, copper, oil shale, iron ore).

2. minerals are found in diverse geographic and environmental settings, and therefore mining and processing activities result in a number of different kinds of impacts;

3. national and regional priorities should include the need to mine within the context of technological, economic and social conditions.

B. Reclamation

1. many desired postmining objectives may be realized without the development of a specific regulatory mechanism;

2. mechanisms to control mining and reclamation must be designed with a knowledge of extraction practices and an understanding of environmental consequences;

3. beneficial postmining land use may include altering natural areas and creating residential, agricultural and industrial areas;

5. data on costs associated with waste control and reclamation are incomplete;

6. some existing state reclamation programs are not enforced, do not contain adequate technological information, and do not consider all aspects of mining and the environment;

7. requirements for reclaiming and revegetating explored lands should recognize ecologically diverse areas.

C. Land Use

1. mining uses a small part of the land resource of the Nation;

2. reclamation efforts have the greatest chance for success if they are integrated into the total mining operation and are directed to a postmining land use;

3. practicing conservation of resources by full extraction may not be possible for some commodities. (Economic or environmental constraints may prevent the extraction of the entire ore body).

D. Government Controls

1. governmental efforts to control the adverse environmental impacts associated with mining activities are not well coordinated;

2. mining technology must now consider and be integrated with environmental control technology and reclamation techniques;

3. the land use planning processes of local governments generally do not consider the land use needs of mining;

4. laws governing mining on public land need to be integrated with laws providing for land use planning;

5. governmental control techniques for mining and reclamation include: (1) education and technical assistance, (2) economic incentives, (3) regulation aimed at securing certain results after mining, (4) regulation aimed at controlling the practices that produce those results, and (5) public ownership of surface rights.

During the preparation of the COSMAR report, the Council emphasized the need to describe in detail the environmental impacts associated with the surface mining of non-coal minerals. An inventory of such environmental impacts is an important prerequisite to effective and reasonable regulation of surface and open pit mining and reclamation for minerals other than coal.

III. Environmental Impacts of Surface and Open Pit Mining

COSMAR recognized that there are environmental problems associated with non-coal mining activities. The Committee noted that these problems exist although most aspects of mining operations are currently subject to federal, state, and local laws. COSMAR concluded that these problems occur because of: (1) lack of enforcement and implementation of existing laws and regulations; (2) site-specific factors which, because of limitations in current mining technology, make it difficult to limit environmental degradation and develop

effective reclamation; and (3) an inadequate data base for existing environmental systems which limits understanding and defining the environmental consequences of a proposed mining operation.

These adverse environmental impacts include:

- Alteration of fragile wetlands, arctic ecosystems, terrestrial and aquatic wildlife habitats;
- Land use conflicts which result in social and economic effects;
- Health effects from environmental insults found in tailings, waste rock, and fugitive dust (release of radioactive elements in the mining, beneficiation, and processing of certain non-coal minerals);
- Groundwater contamination caused by mine water, dump leachates, seepage from tailings, impounded waste solutions, and deep well disposal of wastes;
- Degradation of surface water quality due to mine waste piles or tailings or process waste solutions containing chemicals, radioactivity, or sediment;
- Climatic, physical, or chemical conditions limiting revegetation or reclamation.^{5/}

Currently, there are a number of government/industry cooperative programs which are attempting to minimize the adverse environmental impacts associated with mining activities. In order to mitigate the environmental consequences listed above, these effects should be given high priority.

Some of these environmental concerns apply only to the nationally important regional mining operations which include copper (Arizona), iron (Minnesota), phosphate (Florida and Idaho), uranium and oil shale (Rocky Mountain region).^{6/} The small sand and gravel, crushed stone, and other quarrying operations have environmental effects, but they are substantially different and are of lesser significance and magnitude. The COSMAR report discussed the specific environmental impacts associated with each of these five major commodities. A summary of the principal environmental effects associated with mining and processing these five commodities follows:

A. Copper. Mining of copper occurs primarily in the southwestern region (Arizona, Nevada) of the United States. The processing of this mineral results in the production of potentially toxic tailings which may occupy an area of many square miles.^{7/}

The milling process is also responsible for the consumption of vast quantities of water. For a typical copper deposit, 240-480 gallons of water per ton is consumed.^{8/} The water usually comes from aquifers that are also supplying water for irrigation purposes. This ground water "mining" has been one of the most serious resource problems in the West. COSMAR concludes: "To the extent that milling of ores may contribute to the problem of ground water depletion,

consideration of water resources as an aspect of mineral policy must recognize the consumptive demands of such operations."^{9/}

Overburden and other waste rock that result from copper mining produces large barren expanses that have not responded well to reclamation. Land forms are permanently altered by the formation of large open pits, sterile waste rock, tailing and slag (smelter material). Long-term weathering converts sulfide materials in the tailings to sulfates and sulfuric acid.^{10/} Some attempts to vegetate these tailing ponds have been successful. However, in the arid west there has been limited success since disturbed lands require long-term irrigation and maintenance. A report prepared by the USGS Resource and Land Investigations (RALI) program concludes, "because of adverse physical conditions, the nature of the mining and processing operations, the relatively low land values, and the lack of reasonable reclamation laws, integrated reclamation and land use planning might be more difficult to implement in the copper mining industry of the southwest than in any other of the study sites addressed by this program."^{11/}

Tailings impoundments at major open pit copper operations now total about 50,000 acres. This figure may be compared with about 30,000 acres in waste dumps and 13,000 acres in pit excavation.^{12/} Air and water pollution also result from copper mining, processing, and smelting; these environmental concerns are also addressed in the COSMAR Report.

B. Iron Ore. The United States is the fourth largest producer of iron in the world excavating 50 million short tons in 1976 and a projected 80 million short tons in 1985.^{13/} Ninety percent of the iron is mined in open pits which may be several miles long and up to one mile wide.^{14/} Total annual output of waste or crude ore averages 5.8 million tons per mine or about 16,000 tons per day.^{15/} Waste ore or overburden is equal to 1/3 to 3 times the amount of crude ore produced.^{16/} The tailings in Minnesota and Michigan would cover a 40 square mile area.^{17/} Land is needed for disposal of overburden and tailings and for construction of haul roads. Mining waste dumps in the Mesabi Range cover 11,000 acres.^{18/} Land is also needed for processing plants, storage piles of crude ore and concentrates, and tailings ponds for beneficiation and for coke production.

In a 2,100 square mile study area in Northern Minnesota, the urban areas make up 2% of the land area and were near to and tied to the iron mines. The mines totaled 3%; forests of aspen-birch, spruce-fir, and white, red and jackpine stands for harvest, 77%; lakes, 8%, bogs and swamps, 4%; pasture, 4%; and land cultivated for agriculture, 2%.^{19/} Fifty-two percent of the land is under some type of private ownership. Thirty percent, concentrated in the Superior

National Forest and managed by the U.S. Forest Service, is under Federal control. Twelve percent is State parks, forest lands, swamps and university trust land and 10% is county tax forfeited land.^{20/} By the year 2000, an additional 20,000 acres are projected to be in iron mining with 90% of the land taken from forested areas.^{21/}

Water pollution from iron mining results in decreased revenues from recreation usage including swimming, boating and fishing. Residential and recreational property values within 4000 feet of a waterway are most affected with the values increasing 3-25% from pollution abatement measures.^{22/} Damage to agriculture from salinity, acid sulfates, suspended solids, heavy metals and micro-organisms was estimated at \$66 million in 1973 and \$100 million in 1977.^{23/} Asbestos-like fibers in the tailings ponds run off into waterways and can find their way into drinking water.

Air pollution from dust and diesel fumes from earth moving equipment, coke oven emissions, sulfur oxides, particulates and fluorides can cause respiratory disease in exposed workers as well as extensive damage to the forests. Acid precipitation which occurs in the area is also detrimental to the forested region. The many lakes act as sinks for metals; high concentrations of iron have been discovered in Colby Lake.^{24/}

Iron excavation typically encompasses a lengthy mining process precluding reclamation from 10-15 years. Exploration can take 10 or more years at cost up to \$25 million dollars. Pre-production takes 3-5 years during which there is rapid growth in employment and support services. Production includes start-up, full production and shut down and post production takes 5-10 years during which reclamation and attempts at pollution elimination occur.^{25/}

C. Phosphate. Mining of phosphate ore takes place in the Coastal plain (primarily Florida) and the Middle Rocky Mountains physiographic province (primarily Idaho).

Of the approximately 170,000 acres of land that have been mined the coastal plain, only 36,000 acres have been reclaimed.^{26/} Phosphate mining destroys the surface ecosystem (including wetlands), alters soil profiles, and often makes the land unsuitable for native vegetation. However, development projects are currently underway by the industry in cooperation with the State of Florida Game and Fresh Water Fish Commission to establish a technology for restoring wetlands after mining.

Clay wastes (slime ponds) are the most obvious problem associated with Coastal Plain phosphate mining and beneficiation. These slime ponds, which take up to 70 percent of a mined area,^{27/} retain valuable water, prevent contemporaneous reclamation and may contain toxic and hazardous substances.

At the present time the industry is working closely with the Bureau of Mines to reduce the problems associated with phosphate "slimes."

In the last few years considerable concern has been expressed over the potential radiation hazard associated with phosphate mining, beneficiation and processing. The radiation comes from radium and radon contained in materials brought to the surface by mining the phosphate ore. More research is necessary to determine if a health hazard exists, and if so, how to effectively control it.

In the Rocky Mountains physiographic province, phosphate mining has produced erosion and mass movement of disturbed land. This, in turn, has resulted in increased levels of suspended particles in streams which may adversely affect aquatic fauna in the streams receiving this effluent.^{28/}

Forty-six thousand acres of federal land are committed to phosphate development in southeastern Idaho.^{29/}

Existing phosphate plants in Idaho may exceed both primary and secondary standards for particulate matter. Idaho's primary and secondary air quality standards are forecasts to be exceeded for SO₂, particulates, and fluorides.^{30/}

D. Uranium. Mining and milling of uranium ore results in a number of environmental impacts. Surface mining disperses in the atmosphere the same toxic substances which have caused health problems in underground mines. At an underground mine, ventilation systems are necessary to carry fugitive

dust and radon gas aboveground in order to protect the miners' health. The dust contains uranium and its radioactive decay products, including radium, which releases hazardous radiation. Radon gas can decay within the lungs, so that carcinogenic "radon daughters" accumulate in lung tissue. At an open pit mine, dust and radon are less concentrated because they are released to the atmosphere directly. Research is needed to show whether the health effects of these surface releases is significant.^{31/}

Most domestic uranium deposits are in sandstone, which is sufficiently porous to make water seepage a problem in some mines. The water pumped from some mines contains such high concentrations of radioactive material that uranium may be extracted from them profitably.^{32/} Surface mines require the removal of large amounts of overburden and waste rock to expose valuable ores. Land reclamation at western sites may be difficult because of low precipitation, high evaporation, a short growing season, and poor soil.^{33/} If there is a possibility that houses or buildings will be constructed on top of a former mine site, the release of gamma radiation from the uranium deposit may be a significant health hazard.^{34/}

A small percentage of uranium mined in the U.S. is extracted by "solution mining," i.e., the pumping of a large volume of alkaline or acidic solution through porous rocks containing

uranium. The mineral is leached out of the rock in situ. In addition to the potential for toxic spills, there exists a possibility of ground water contamination and the problem of disposing of waste solutions. Similar problems exist when uranium is recovered by percolation leaching of ore in piles.^{35/}

Uranium milling results in the accumulation of large piles of finely ground waste rock from which most of the uranium has been removed. Domestic uranium ores currently being mined contain between 0.1 and 0.3 percent uranium oxide,^{36/} i.e., from two to six pounds per ton. Thus, for every ton of uranium ore delivered to a mill, nearly a ton of mill tailings are produced.^{37/} Unless an adequate cover is maintained, these tailings piles will generate radon gas for thousands of years via radioactive decay of thorium.^{38/} Current regulations require all companies milling uranium ores to have reclamation programs to maintain adequate cover. Alkaline or acidic leachate solutions containing radium and other toxic substances may leak from tailings piles into surface streams and groundwater. The collapse of dams used to impound uranium tailings piles may result in further contamination of streams. Wind-blown dust from these piles can also be a health hazard. Current regulations require clean-up of lands affected by wind-blown dust from uranium tailing piles. Stabilization of tailings piles under a vegetative cover may reduce health hazards and also provide the aesthetic and ecological benefits of land reclamation. ^{39/} In semi-arid or arid environments, stabilization of tailings piles cannot be guaranteed by utilizing

a full self-sustaining vegetative cover. Moreover, it has been found that such cover takes up radium from the tailings and allows it to get into the food chain if the cover is eaten by grazing animals. Current technology calls for covering tailings piles with a compacted clay layer, which in turn is covered with rock or soil. This will, among other things, keep vegetation roots from reaching the tailings themselves.

However, at a surface uranium mine the volume of overburden, mining waste, and low-grade ore material may be as much as 12 times the volume of marketable ore, and therefore much larger than the volume of mill tailings. Reclamation of surface uranium mines, therefore, may involve stabilization of a much larger amount of material than that deposited in the tailings piles alone.^{40/}

E. Oil Shale. The environmental impacts associated with mining and processing of oil shale received considerable attention and were emphasized in the COSMAR Report and in a more detailed separate panel report on Oil Shale and Tar Sands.^{41/} This panel report focused on the relationship of oil shale (and to a lesser degree, tar sands) deposits to land, water, air, and biological resources and social conditions. The Panel's paper stated that synfuel development may have significant direct adverse environmental impacts in Colorado, Utah, and Wyoming and indirect effects over a much larger region. These impacts may produce a permanently damaged environment for future generations unless creative and innovative mining technology is developed and coordinated land

management practices are implemented. The Academy's detailed evaluation and assessment of the potential environmental impacts associated with oil shale development resulted in the following conclusions by the COSMAR Panel:

- ° The large land area required for disposal of processed shale and other solid wastes will significantly alter existing land uses, the natural topography, surface drainage patterns, and the ecological balance of the region.
- ° Streams and ground water will be adversely affected -- the hydrologic system will be contaminated with organic and inorganic materials; retorts may include ammonia, hydrogen sulfide, volatile organic compounds and malodorous substances. (The degree of this contamination and the need to develop adequate control techniques remain uncertain.)
- ° Oil Shale mining and processing may result in releases of carbon monoxide, non-methane hydrocarbons, nitrogen dioxide, sulfur dioxide, photochemical oxidants and particulates which could exceed existing air quality standards. Research is currently being developed on atmospheric modeling to make dependable predictions of air quality under the cumulative impacts of oil shale development.
- ° Existing clean air probably will be degraded by air pollutants for which there are currently no standards. These pollutants include arsenic, mercury, mercaptans,

carbonyl sulfide, and organic compounds that are potentially carcinogenic.

- An increase of consumptive water use from the region containing oil shale deposits could reduce water supplies for irrigation and municipal uses, would increase surface water salinity, and could bring destructive changes in riverine and estuarine ecosystems. Several studies, however, conclude that there is an adequate supply of water to support oil shale development, irrigation, and municipal uses.
- Successful long-term revegetation of stable plant communities on processed shale has not yet been demonstrated. Thus oil shale mining and processing may result in permanent local losses of mountain shrubs, bottomlands, meadows, and riparian wildlife habitat. Research on revegetation of spent shale is currently being undertaken.
- Procedures for developing and implementing suitable postmining land use plans have not yet been established.
- An industry yielding one million barrels/day by in situ processing could release one percent of the annual global production of carbon dioxide. These emissions could in turn contribute to a significant effect on the world's climate by raising the global temperature.

- Socioeconomic impacts associated with oil shale development (including the "boom town" syndrome) should be viewed as an issue of critical concern to the region.
- The long-term stability of surface disposal piles is uncertain; precedents for the design of waste piles of this magnitude are not available, and plans for abandoning them have not yet been developed.
- Control technologies for the principal water-related impacts associated with an oil shale industry are extremely uncertain. No workable procedures have been demonstrated for treating water produced during retorting or for controlling leachates derived from in situ retorts.

Based on this information, one of the conclusions reached by the COSMAR Panel on Oil Shale and Tar Sands was: "The experimental nature of oil shale technology, uncertainty about the impacts of development, the likelihood of regional impacts, and the lack of control technologies for some of the potentially most serious impacts argue for gradual and cautious development of the resource."^{42/}

The amount of land potentially subject to oil shale development is enormous. It was estimated that about eighty percent of high grade shales are found in 600 square miles of one basin (Piceance Creek Basin) in Colorado. The actual area affected will depend on the technologies utilized to develop the oil shale resource. (If lower grade shales are mined, the disturbed area would increase significantly. If one adds to that the Eastern Utah Tar Sand Triangle -- an area of 200-300 square miles^{43/} that overlaps Canyonlands National Park and the Glen Canyon National Recreation Area -- then the scope of the problem begins to dwarf prior land use activities. Increased coal and other mineral mining is also anticipated in this region.)

COSMAR's description and characterization of the adverse environmental impacts resulting from mining and processing of gigantic mineral deposits led the Committee to the following conclusion: "Economically, these resources are so vast that they are, or could be, a mainstay of the national way-of-life, but geographically they are confined to a single State or to a small group of contiguous States. They are thus of national interest, but their extraction brings irreversible social, economic, and environmental changes to local regions of the country, all of which involve trade-offs between benefits and hardships. That is, development of such resources, each with its own set of problems, results in permanent changes in the broad patterns of land use."^{44/}

IV. Information Deficiencies

The COSMAR Report revealed that existing state and federal regulatory mechanisms are limited in their scope and effectiveness. The Report, however, does not include an analysis of the specific substantive adequacy or inadequacy of federal and state legislation or regulations. Nor does it evaluate the full range of federal legislation and delineate those sections which consider and attempt to mitigate the environmental impacts of non-coal mining activities.

This information is another important prerequisite to the determination of whether additional legislation is needed. A detailed examination of these laws (those that have been implemented or will be implemented) and their associated regulations would obviously provide additional data useful in answering several questions: Is additional federal legislation necessary and useful? Should existing laws be integrated and coordinated to provide for effective implementation? Once existing and proposed regulations are implemented, will adverse environmental effects be effectively controlled?

The federal environmental laws and regulations which could affect the mining of non-coal minerals are many and complex. A partial listing of the most significant federal laws includes:

- Mining Law of 1872
- Antiquities Act of 1906
- Mineral Leasing Act, 1920
- Fish and Wildlife Coordination Act, 1929
- Migratory Bird Conservation Act, 1929
- Fish and Wildlife Act of 1956
- Clean Air Act of 1963
- Wilderness Act, 1964
- Metal and Nonmetallic Mine Safety Act, 1966
- Wild and Scenic Rivers Act, 1968
- National Environmental Policy Act of 1969
- Endangered Species Conservation Act, 1969
- Noise Pollution and Abatement Act of 1970
- Occupational Safety and Health Act of 1970
- Federal Water Pollution Control Act Amendments of 1972
- Coastal Zone Management Act of 1972
- Colorado River Basin Salinity Control Act, 1974
- Safe Drinking Water Act, 1974
- Toxic Substances Control Act, 1976
- Resource Conservation and Recovery Act of 1976
- Federal Land Policy and Management Act of 1976
- Uranium Mill Tailings Radiation Control Act of 1978
- Power Plant and Industrial Fuel Use Act of 1978
- Quiet Communities Act of 1978

Consideration of the effectiveness of these laws and their associated regulations, as well as state laws and local ordinances, is needed to make an informed decision on the need for further federal legislation. To provide a more systematic basis for this consideration the Council contracted with the National Conference of State Legislatures for a report which would identify and summarize state laws and regulations for non-coal minerals mining and reclamation. This report is now available from NCSL.^{45/} Among the principal findings of this NCSL report are the following:

- Thirty-seven states have a statutory basis for regulating the surface mining of minerals other than coal on a statewide basis. All but two of these statutes require that an operator obtain a permit from a state agency prior to engaging in surface mining. The two exceptions are Florida and Michigan, both of which specify reclamation standards to be met by the operator, and require submission of reclamation plans to the state agency.
- Eight states do not have a statewide regulatory program applicable specifically to surface mining. These include four eastern states where little surface mining occurs (Connecticut, Delaware, New Jersey, and Rhode Island), three western states with substantial mining activity and large amounts of public lands (Alaska, Arizona, and Nevada), and the state of Nebraska.
- Five States (Kansas, Louisiana, Massachusetts, New Mexico, and North Dakota) regulate the surface mining of coal, but the governing statute is not applicable to other minerals.
- Only fifteen of the states regulating surface mining of minerals other than coal provide for the possibility of a public hearing prior to granting of a permit.
- Thirty-five of the thirty-seven states regulating the surface mining of minerals other than coal require the operator to file some form of bond or security before engaging in the mining activity. Ten states provide for release of part of the bond prior to completion of all requirements relating to the land covered by the bond.
- All the states regulating surface mining specify reclamation standards, either by statute, rules and regulations, or a combination of the two. The standards differ considerably in specificity, and often vary depending on the minerals covered by the law and the most important environmental concerns potentially affected by mining in the particular state. 46/

Although COSMAR did not provide an in-depth evaluation of existing federal or state legislation, the Committee did attempt to respond to the provision in SMCRA that requires a discussion of regulatory mechanisms. Regulatory mechanisms

are defined by COSMAR as "the way in which government pursues objectives such as preventing environmental abuse, reclaiming mined lands, and securing desirable postmining land use."^{47/}

COSMAR preferred the term "institutional approaches" to regulatory mechanisms because the Committee felt that "there are ways to accomplish such objectives other than direct regulation of the activities of miners."^{48/} Concerns involved in selecting institutional approaches include: (1) the choice of a control technique, (2) the relationship among levels of government in controlling impacts, and (3) the means for integrating and coordinating the many laws and regulations that affect mining.

COSMAR did not provide an in-depth analysis of the alternative institutional approaches considered. Its brief discussion of these approaches is not followed by recommendations and conclusions. The COSMAR Report does recommend that the land use planning process should serve as a coordinating device for other control mechanisms (permits for effluent discharge, state or federal environmental impact statements). COSMAR however, does not explain how the land use planning process would achieve this goal. At times, regional land use planning has been ineffective in obtaining environmental objectives.

CEQ held four public hearings (in San Francisco, Denver, Atlanta and Washington, D.C.) during February and March, 1980 to elicit comments on the COSMAR Report and to receive opinions and potential legislative recommendations. One of the primary objectives of these hearings was to obtain additional detailed information on the environmental consequences of non-coal mining and on appropriate regulatory mechanisms to control these environmental impacts. These hearings were held in different regions of the country to encourage the participation of individuals and organizations concerned with the mining and processing of a variety of non-coal commodities.

The Council received approximately 150 comments during and subsequent to these hearings. Comments were supplied by government agencies, industry representatives, and public interest groups (see Appendix B for a listing of the persons and organizations that submitted comments to the Council).

The number and quality of the comments suggest considerable concern over the question of regulation of non-coal commodities. Recommendations and conclusions presented by the public and private sectors confirmed that there was considerable disagreement over what are appropriate and reasonable legislative recommendations. Differences in opinion were also expressed on the quality of the COSMAR Report and some questions were raised about its focus and perspective.

V. Conclusions and Technical Recommendations

The passage of the EMCRA in 1977 indicates that Congress recognized the need for a commodity specific (coal) resource policy designed to protect the quality of the human environment. This Act was considered necessary despite the prior enactment of a broad range of federal legislation designed to control specific environmental problems or mining practices, including those 24 statutes cited above.

In 1973 prior to the passage of recent extensive environmental legislation, the National Commission on Materials Policy (Material Needs and the Environment Today and Tomorrow) stated: "The pace of action to protect the environment, which started approximately a decade ago, has not yet matched the speed of environmental degradation in spite of particular instances of improvement.... Existing legislation is neither extensive enough in scope nor powerful enough in sanctions to induce the social response desired."^{49/} Seven years later, the American Mining Congress, in its comments on the COSMAR Report, offered a different perspective: "In sum, it is well to remember that much of the environmental body of law is still very new.... Some of the regulations implementing those laws have not been issued for a number of years following passage of the legislation and then have required quick

compliance from industry.... While a detailed examination of existing environmental laws may have been beyond the scope of the COSMAR study, the American Mining Congress believes that such a review is an essential prerequisite to the consideration of additional regulatory proposals, if any, by the Council on Environmental Quality and the Congress."⁵⁰

A detailed examination of the adequacy and effectiveness of existing environmental legislation and regulations requires an understanding of the scope and magnitude of environmental problems associated with non-coal mining activities. Unfortunately, there are significant information gaps in the data needed to assess the environmental impacts of mining most (if not all) non-coal commodities. In its comments on the COSMAR Report, the Department of the Interior recommended further study to "(1) identify and evaluate the impacts of mining for a specific commodity or a group of related commodities; (2) describe existing Federal, State and local control mechanisms and their effectiveness in specific environmental settings; (3) identify gaps in coverage of important impacts and impacts that are inadequately controlled; and (4) propose possible legislative or other corrective action."⁵¹ This statement may not represent the views of the present Administration. Federal agencies were asked to comment on a draft of this report during the spring of 1981; no comments were received from the Interior Department.

In addition to determining the need for corrective action, additional technical research is needed to determine and monitor environmental change and to improve mining technology so as to minimize environmental impacts. At the present time there is no clear understanding of how technological change, materials production and environmental quality can be related. More emphasis must be placed on identifying the potential adverse environmental impacts which may be caused by exploration, mining, beneficiation, processing, and transportation of specific non-coal commodities. The mining industry should continue to develop programs which focus on reducing the toxic and hazardous components of tailings and waste rock. Such an effort could be integrated with existing programs on recovery efficiency. Removal of a mineral should not result in increased levels of hazardous pollutants in the environment.

New methods are needed to accelerate existing programs for restoration and/or reclamation of surface mined areas. This is particularly true of the semi-arid western lands. Technological and economic feasibility studies should be developed for possible large-scale reclamation of areas to be affected by oil shale and tar sands development, for

example. Areas for consideration should include but not necessarily be limited to: topsoil and subsoil suitability, composition, and fertility; the sequence of soils salvage, and which areas will be covered with soil from soil storage areas; re-establishment of grass, shrubs, and trees; elimination of toxic elements in tailings and waste rock; re-establishment of natural wildlife habitats; protection of surface and ground water systems from environmental degradation; the effects of consumptive water use; and the social and economic impacts of different reclamation programs.

Continued consideration must be given to internalizing the full cost of natural resources alteration and reclamation during the mining of non-coal commodities. Industrial economic calculations should incorporate external air, water, and land pollution costs into the determination of a "valuable deposit." Those industries involved in the mining, processing and distribution of locatable and leasable commodities on public lands and the federal and state agencies that regulate these activities must acknowledge and help determine these costs now borne by the public. Federal and state agencies should require the implementation of technically and economically feasible environmental mitigation measures.

Requirements for the reduction of environmental damage must also recognize and take into account the cost to the mining industry of meeting them. An understanding of the needs of the industry, however, must be coupled with

an objective evaluation of the nature and extent of the resulting adverse environmental and health effects.

Chapter 6 of the COSMAR Report delineated five governmental control techniques which could be applied to the mining industry: (1) education and technical assistance; (2) economic incentives; (3) regulation aimed at securing certain results after mining; (4) regulation aimed at controlling the practices that produce those results; and (5) public ownership of surface rights.

What follows is a brief discussion of the circumstances under which each of these control techniques cited in the COSMAR Report might most appropriately be applied.

(1) Education and technical assistance. Although this approach is not a control technique, but rather a form of government subsidy, it can be an effective means of improving mining technology in order to minimize environmental degradation. Specific educational programs could familiarize those within the mining industry with environmental values and perspectives and technical assistance programs could make it easier for mining companies to comply with regulations. If reclamation expenditures can be recovered in the form of increases in the resale value of mined land, technical assistance may

promote land reclamation even in the absence of regulation. On arid lands, this situation is unlikely to arise, and technical assistance alone will not be sufficient.

(2) Economic incentives. These should be considered whenever progress toward an environmental objective can be monitored by clearly defined indicators. For example, economic incentives can be used in air pollution control because improvement in air quality can sometimes be measured by the quantities of pollutants released in stack gases.

Effluent charges should provide an incentive to a company to reduce pollution to the level at which its incremental expenditures on pollution control are no longer justified by a reduction in payments (of effluent charges) to the government. Marketable permits provide an incentive to minimize the cost of meeting an industry-wide quota by buying and selling the permits. An economic incentive program could include options for meeting some regulations aimed at controlling practices. This approach could ensure that some minimal level of progress toward environmental goals is achieved.

(3) Regulation aimed at securing results after mining. This control technique should be used when economic incentives appear inappropriate. This condition might occur when there are no clearly defined indicators with which to monitor progress in reducing environmental degradation. For example, the aesthetic qualities of reclaimed land cannot be described

in numerical terms. The slope of a hill does not have an optimal aesthetic value, even though it is reasonable to establish a maximum allowable slope for surface mining and reclamation. Similarly, the value of ecosystems are not absolute and therefore cannot always be quantified. If the results sought by regulation are difficult to describe, it may be desirable for the government to give an example of preferred practices which would achieve compliance with the regulation. Moreover, economic incentives can be used to achieve desired specific results; an example is the use of EPA's "bubble" policy in trying to attain National Ambient Air Quality Standards.

(4) Regulation to control the practices that produce those results. A regulation aimed at controlling practices can be defined as one which identifies specific tasks to be done and leaves the regulated company or individual little choice about how compliance is to be achieved. For example, a pollution control standard which species the kind of filter to buy, where to install it, and when to operate it is a regulation of practices. By contrast, a regulation aimed at securing results allows a choice among alternative methods of achieving compliance. An equipment standard is aimed at practices; a performance standard is aimed at results.

Regulations to control practices are best used temporarily or in conjunction with economic incentives or regulations to achieve end results. Exclusive reliance on the control of practices would remove the incentive to develop new and less costly methods of reducing pollution. Consequently, regulation of practices is useful primarily in defining the minimum acceptable effort, not in promoting the ultimate objectives of environmental quality programs.

(5) Public ownership of surface rights. The purchase of land by the government is appropriate when it is clearly in the public interest to do so (e.g., National Parks and Wildlife Refuges). If mining on public lands results in significant environmental impacts, the public interest should be protected by the appropriate management and regulatory agencies. If mineral resources are found on public lands, the effective utilization of those resources may also be in the public interest. Environmental land use planning and effective resource management programs must both be developed and integrated if multiple use of public lands is to continue over the long term.

* * *

Depending on the specific mineral commodity, geographic region, and proposed extraction process, any or all of these five techniques might result in the effective regulation and

satisfactory reclamation of mined land. However, the expanding need for non-coal minerals coupled with further reductions in ore concentrations will probably result in increased adverse environmental impacts over the next several years unless these techniques are more effectively integrated and applied. Any regional system of natural resource management will require a "systems" or ecological approach. This approach must include interdisciplinary planning and evaluation of proposed federal actions in keeping with the principles set forth in the National Environmental Policy Act. The Council believes that this approach not only is consistent with existing federal laws affecting surface mining, but should provide an effective means of addressing comprehensively the many regulatory requirements that can apply to non-coal mineral mining and reclamation operations.

VI. Legislative Recommendations

The Council does not at this time recommend that the Congress enact any new legislation regulating non-coal minerals mining and reclamation on public or private lands. This conclusion is based on an analysis and evaluation of the COSMAR Report and comments from federal and state agencies, the mining industry, the environmental community and additional reviewed information. The Carter Administration previously recommended to the Congress a reform of the Mining Act of 1872 in order to recover royalties for hard-rock minerals mined on the public lands and to allow federal land management agencies greater flexibility in controlling the adverse environmental impacts of such mining.^{53/} The Council has not re-evaluated this proposal; we simply note that it was not adopted by the Congress.

Selected agency comments to the Council on the issue of federal legislation are summarized below:

Department of the Interior: "[S]ubstantial additional work is needed before a determination can be made as to whether Federal legislation is necessary to control the surface mining of any non-coal mineral. Analysis which follows this [COSMAR] report should examine specific major minerals of national importance. Any needed legislation should be identified from this effort."^{54/}

Department of Energy: "The usefulness of the [COSMAR] report as a basis for draft legislation is reduced by the current lack of information regarding impacts of developing energy technologies, the feasibility of controls, and the cost of such techniques."55/

EPA, Office of Water Enforcement: There is a "need for better coordination and integration of existing laws and regulations for the mining industry and emphasize the importance of coordinating the various permitting processes in order to limit the potential for conflicting controls."56/

EPA, Office of Solid Waste: "We feel that any legislation to adopt or modify the Surface Mining Control and Reclamation Act (SMCRA) to deal with non-coal mining waste would be inappropriate at this time.... There are not yet sufficient data or information available on non-coal mining to appropriately modify SMCRA to deal with these issues... regulation is already adequately provided for under RCRA."57/

Council on Wage and Price Stability: "[C]are should be exercised in making legislative recommendations to the Congress because of the enormous uncertainties that currently exist concerning the positive and negative aspects of a greater federal presence in non-coal mineral mining -- not to mention the uncertainties associated with the environmental problems themselves. Conclusive recommendations for legislation beyond technical assistance to the states for existing environmental programs, and further federal analysis, does not appear to be appropriate at this time."58/

Public comments may be summarized as follows:

Industry is opposed to any federal legislation for non-coal minerals that would be similar to P.L. 95-87 (SMCRA). Leaders feel that national legislation and all-encompassing regulations would inhibit existing innovative reclamation programs. Another frequently encountered statement was that surface disturbances caused by non-coal mineral extraction and the attendant need for reclamation are local problems, and that cumulative effects should be addressed by local and state authorities because they are much better equipped to respond to these problems than federal officials remote from the mining operations.

State Government officials appear to be in general agreement with industry that the detailed requirements of SMCRA are not suited to non-coal surface mining and that the states are generally capable of achieving effective reclamation and beneficial post-mining uses of land altered by non-coal mining operations.

Environmental groups tend to favor federal legislative action but also conclude that COSMAR failed to develop specific recommendations based on a logical progression of analysis. Some commenters concluded that the report was flawed because it failed to identify various classes of

environmental problems by mineral and did not adequately evaluate the identified regulatory approaches. Some recommended that gaps in existing federal laws be specifically delineated in order to determine where additional legislation may be needed.

VII. Policy Recommendations

A. General Recommendations:

(1) The material supply system (mining of raw materials, beneficiation and processing of ores) is directly affected by environmental regulations. Mining and processing operations often generate large volumes of wastes (e.g., copper, iron, phosphate, uranium, oil shale) and may be the source of significant costs if toxic and hazardous substances are to be controlled. Large mining operations are capital intensive; the industries are required to advance large sums of capital for investment in mine and mill installations. Costs associated with changes in environmental performance and reclamation standards could have adverse effects on the economic viability of these operations. Therefore, long range materials and environmental planning should precede decisions that will direct costs either to the industry or to the environment and thus to the general public. This goal will require a coordinated effort by those interested in non-coal mining and in the maintenance of the quality of the environment.

(2) The Council recommends that the President establish an interagency Non-Coal Mineral Council to oversee development of commodity-specific mineral resource management and mining reclamation policies. This Council should be chaired by the Department of the Interior with representatives from Agriculture, Commerce, Labor, EPA, CEQ, the Office of Management and Budget, and the Regulatory Council. The development of commodity-specific mineral resource management and reclamation policies would require participation from state governments, the mining industry, and concerned public interest groups. Issues to be considered by this Coordinating Council during the development of resource management policies should include the recommendations set forth below. Initially, commodity-specific policies should be developed for minerals where significant environmental problems have been identified (e.g., copper, phosphate, uranium, oil shale, and iron).

B. Specific policy recommendations:

(1) The developing synthetic fuels industry will require immediate attention and could benefit from the application of a systems approach. Interactions between the environment and oil shale and tar sands development urgently call for an interdisciplinary approach which gives the Nation's economic and environmental objectives equal consideration. Continued attention should be given to the cumulative

adverse environmental and health impacts which may develop as a result of oil shale mining as well as to the most cost-effective long-term mining and reclamation plans. Because much of the development of oil shale and tar sands is taking place on public land in the West, the Council recommends that the Department of the Interior, in cooperation with the Environmental Protection Agency and the Department of Energy, carefully consider the potential environmental, health and safety impacts through comprehensive environmental impact statements and recommended plans for commercial oil shale and tar sand development on public lands.

(2) Other specific resource management policies should be developed and implemented for major mineral commodities over the next five years by the federal regulatory and land management agencies. The past efforts of federal and state governments to control the adverse environmental impacts associated with mining activities have not been well coordinated. Although many environmental performance standards have generic applicability, the difference between commodities and the environment in which they are obtained requires that attention be given to major mineral commodities (copper, iron, phosphate, uranium, and oil shale) separately.

(3) Prior to approval of leases and mining plans on public lands, consideration should be given by federal agencies to the cumulative adverse environmental impacts associated with mining of a commodity in a specific geographic region. This approach will require the advance development of environmental, social, and economic projections for both construction and operation phases, and the desire to minimize environmental impacts associated with many site-specific operations. In the long run, this information would not only help protect the environment but would be in the economic interest of the industry as well.

(4) The EPA, in cooperation with the Office of Surface Mining (OSM) and in consultation on intergovernmental issues with the Advisory Council on Intergovernmental Relations, should develop general environmental guidelines for the non-coal mineral industries to help them meet the environmental standards required by affected states and localities. Development of general environmental guidelines would require participation from the state governments, the mining industry, and concerned public interest groups. The range and diversity of non-coal commodities presently preclude an effective federal enforcement program to minimize or mitigate environmental impacts. For commodities of primarily local impact, such as sand and gravel, which is increasingly regulated at the state and local levels as well as subject to specific federal environmental controls, further direct federal enforcement

programs appear unnecessary. Some states presently lack sufficient scientifically and technologically trained individuals, but this problem should be resolved primarily by the states, with federal assistance to be provided through existing programs only where necessary.

(5) The EPA should carefully analyze on a commodity-specific basis the effectiveness of existing environmental legislation and regulations intended to mitigate the environmental impacts resulting from non-coal mining activities. This review might result in improved implementation of existing regulations and avoid the development of additional layers in the regulatory process.

(6) The mining industries should make a concerted effort to integrate engineering, economic, and environmental analyses during planning operation. Until these disciplines are integrated, problems of solid waste disposal, air and water pollution, and socio-economic dislocations will continue to increase.

(7) Federal land management agencies should place greater emphasis on the "valuable mineral deposit" concept currently being used to evaluate claims for locatable and leasable mineral commodities. The concept originated in the 1872 Mining Law and is carried forward in the 1920 and 1947 Leasing Acts. In the past, the determination of a valuable deposit did not include the cost of reclamation or environmental protection and restoration. Systematic inclusion of environmental costs would assist in a more accurate determination of a "valuable deposit."

(8) Regulatory agencies must consider large mining operations of national significance (copper, iron, phosphate, uranium, and oil shale) separately from ubiquitous sand, gravel, and construction aggregate mining operations. There are major differences in economic, environmental, and sociological factors which separate these two major groups of mining activities.

(9) The federal government should develop general guidelines for the states in order to achieve effective post-mining land use objectives. Development of these general guidelines would require participation from state governments, the mining industry and concerned public interest groups. Effective reclamation can be developed within the context of existing federal environmental legislation. The Council's review of state reclamation programs suggests that federal leadership and assistance would contribute to the development of more effective state programs. The federal government should encourage those states without a statewide regulatory program for surface mining to consider legislative action.

(10) The concept of maintaining the ecological integrity of unique or sensitive natural or man-made resources should be applied by state and federal agencies to mining of construction aggregates as well as other commodities of national importance

found in a limited number of geographic areas. It will be necessary, on occasion, to restrict access to environmentally sensitive lands. The importance of these areas should not be diminished because of the absence of a mechanism to quantify their value. However, ecological criteria can and should be developed by industry, government and academic institutions to establish clear guidelines for areas that should be designated as unsuitable for mining.

(11) Similarly, following a determination of the availability of construction aggregates or minerals of national importance in a specific geographic region, areas should be designated as suitable for mining. When areas are environmentally sensitive and contain a valuable mineral, it will be necessary for the industry, the public, and the government to compromise in order to extract an economically viable portion of the commodity while maintaining environmental quality.

(12) Beneficial post mining land use should include innovative and creative attempts to develop and create residential agricultural and industrial areas. This use may result in the alteration of natural areas but may be in both the public interest and the economic interest of the industry. Frequently it is not possible to restore mined land to a "natural" state. However, coordinating reclamation with community development interests could benefit the community

and enhance the industry's profitability. Emphasis should be placed on effective means of reducing environmental degradation and reclaiming the land rather than on prohibiting surface mining.

(13) Congress and the appropriate federal agencies should explore means to assist the states in initiating interdisciplinary planning, monitoring, and enforcement mechanisms for controlling mining and reclamation of non-coal minerals.

Conclusion

As indicated in the policy recommendations set forth above, the Council believes that more effective regulation of surface and open pit mining and reclamation for minerals other than coal could be achieved under existing laws by administrative actions. These administrative actions could improve interagency coordination in the development and application of the many federal and state laws and regulations affecting non-coal mining and reclamation.

Most existing federal legislation treats energy and mineral resource development as an activity removed from other land use planning and management processes. Clearly, the use of both mineral and non-mineral resources affects the land; decisions, policies, and actions affecting one each inevitably affect the other.

Existing federal laws relating directly to locatable and leasable commodities on public lands do not adequately consider nonmineral resource values. The lack of balance in

existing federal mining legislation coupled with inadequate scientific and technical information on the origin and effects of many environmental insults has limited the ability of federal land management agencies to protect non-mineral resources which they are required to manage in the public interest under other laws. This situation has led to numerous Congressional and Executive branch decisions to withdraw public lands from mineral entry, thereby precluding mining or even mineral exploration on these lands.

The Council finds that more effective interagency coordination would result in better analysis and more efficient regulation of the specific environmental problems known to be associated with mining and processing certain major mineral commodities. Effective mitigation of the environmental consequences associated with mining many of these commodities is an achievable goal if state and federal government agencies, the mining industry, environmental organizations, and the public work together on improving current mining technology to reduce environmental degradation, increasing the efficiency of mineral resource utilization, and respecting the right of all citizens to enjoy the benefits of our nation's mineral and non-mineral natural resources.

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APPENDIX A

Section 709 of the Surface Mining Control and
Reclamation Act of 1977 (SMCRA, P.L. 95-87)

STUDY OF RECLAMATION STANDARDS FOR SURFACE MINING OF OTHER MINERALS

Contract.
30 USC 1299.

SEC. 709. (a) The Chairman of the Council on Environmental Quality is directed to contract to such extent or in such amounts as are provided in appropriation Acts with the National Academy of Sciences-National Academy of Engineering, other Government agencies or private groups as appropriate, for an in-depth study of current and developing technology for surface and open pit mining and reclamation for minerals other than coal designed to assist in the establishment of effective and reasonable regulation of surface and open pit mining and reclamation for minerals other than coal. The study shall—

(1) assess the degree to which the requirements of this Act can be met by such technology and the costs involved;

(2) identify areas where the requirements of this Act cannot be met by current and developing technology;

(3) in those instances describe requirements most comparable to those of this Act which could be met, the costs involved, and the differences in reclamation results between these requirements and those of this Act; and

(4) discuss alternative regulatory mechanisms designed to insure the achievement of the most beneficial postmining land use for areas affected by surface and open pit mining.

Legislative
recommendations,
submitted to
President and
Congress.

(b) The study together with specific legislative recommendations shall be submitted to the President and the Congress no later than eighteen months after the date of enactment of this Act: *Provided*, That, with respect to surface or open pit mining for sand and gravel the study shall be submitted no later than twelve months after the date of enactment of this Act: *Provided further*, That with respect to mining for oil shale and tar sands that a preliminary report shall be submitted no later than twelve months after the date of enactment of this Act.

(c) There are hereby authorized to be appropriated for the purpose of this section \$500,000: *Provided*, That no new budget authority is authorized to be appropriated for fiscal year 1977.

Appropriation
authorization.

APPENDIX B

Listing of Comments Received from the Public on the
National Academy of Sciences' Report, Surface Mining
of Non-Coal Minerals.

STATEMENTS SUBMITTED AT THE COUNCIL ON ENVIRONMENTAL
QUALITY'S PUBLIC HEARING IN SAN FRANCISCO ON SURFACE
MINING OF NON-COAL MINERALS

February 25, 1980

Organization

Individual

1. Independent
2. Southern California Rock Products Assoc.
3. P.W. Gillibrand Co.
4. Grefco, Inc.
5. Transit Mixed Concrete Co.,
6. Blue Diamond Materials
7. Chevron Shale Oil Company
8. Kaiser Cement Corp.
9. Gypsum Association
10. Central Valley Rock, Sand & Gravel Assoc.
11. Conrock Co.
12. United States Borax & Chemical Corp.
13. American Mining Congress
14. Aggregates & Concrete Assoc. of Northern Calif.

Gayle Eads
Don Reining, CAE, Executive Secretary
P.W. Gillibrand
Craig M. Smith
Daniel J. Pellow
Robert R. Munro
Dolores Mack
Jack H. Lucas, Manager of Mining &
Geology
Fred Rogers
Robert Perkins
Gene R. Block, Vice Pres.
F.M. Smith, Mining Manager
Robert Comstock, Director of Exploration
Jack Cedarblade, Executive Secretary

STATEMENTS SUBMITTED AT THE COUNCIL ON ENVIRONMENTAL
QUALITY'S PUBLIC HEARING IN DENVER ON SURFACE MINING
OF NON-COAL MINERALS

February 26, 1980

Organization

Individual

1. Colorado Open Space Council
- 2.
3. Anaconda Copper Company
4. AMAX Inc., Climax Molybdenum Co.
5. Monsanto Co.
6. Cleveland-Cliffs Iron Company
7. Rocky Mountain Oil & Gas
8. Kennecott Minerals Co.
9. Union Oil Co. Of California
10. Phelps Dodge Corp.
11. Colorado Sand & Gravel Producers Assoc.
12. Arizona Mining Assoc.
13. Colorado Mining Assoc.

Roy E. Young
Harrison Cobb
Kenneth G. Reick
Larry F. Brown, Deputy Director
Gordon Aland
Hugh J. Leach
Cindi Gorshow
Frederick E. Templeton, Dir. Environ. Affai
Allen C. Randle
Haggard, Jerry
Bob Downing, Managing Director
Erland G. Johnson, Assistant to the Pres.
David R. Cole

STATEMENTS SUBMITTED AT THE COUNCIL ON ENVIRONMENTAL
QUALITY'S PUBLIC HEARING IN ATLANTA ON SURFACE MINING
OF NON-COAL MINERALS

March 3, 1980

Organization

Individual

1. Sarasota County Board of County Commissioners
2. Georgia Depart. of Natural Resources
3. Aluminum Co. of America
4. Freeport Kaolin Co.
5. Georgia Mining Assoc.
6. Vulcan Materials Co.
7. Tennessee Road Builders Assoc.
- 8.. Thiele Kaolin Co.
9. AGRICO Mining Co.
10. Florida Phosphate Council , Inc.
11. Ralph Rogers & Co.
12. Georgia Marble Co.
13. Manasota - 88

Jeffrey L. Lincer
Sanford Darby, Program Manager
G.C. McBride, Chief Geologist
Roger S. Austin, Mines Manager
Henry C. Stewart
Edward K. Graham
Kenneth M. Kent, Dir. Speical Services
J. Rachels
Don R. Morrow, General Manager
Homer Hooks, President
S.B. Weatherspoon, Safety Director
James W. Hazelwood, Jr.
Gloria C. Rains

STATEMENTS SUBMITTED AT THE COUNCIL ON ENVIRONMENTAL
QUALITY'S PUBLIC HEARING IN WASHINGTON, D.C. ON SURFACE
MINING OF NON-COAL MINERALS
March 5, 1980

Organization

1. American Mining Congress
2. Virginia Aggregates Assoc.
3. National Sand & Gravel Assoc.
4. International Minerals & Chemical Corp.
5. National Crushed Stone Assoc.
6. Pennsylvania Aggregates Assoc.
7. Bethlehem Mines Corp.
8. National Industrial Sand Assoc.
9. Vibra-Tech Engineers Inc.

Individual

H. Stanley Dempsey, Vice Pres. AMAX, Inc.
James E. Fox
David Keating
R.S. Hearon, Environmental Services Supervisor
Charles S. Luck, III President Luck Quarries
Joseph Schmidt, President E.J. Breneman, Inc.
Harry W. Campbell, Vice President
Richard E. Day, Vice Pres. Penn. Glass Sand Co.
G. Alan Foster, Sr. Vice Pres.

ADDITIONAL STATEMENTS SUBMITTED TO THE
COUNCIL ON ENVIRONMENTAL QUALITY ON
SURFACE MINING OF NON-COAL MINERALS

<u>Organization</u>	<u>Individual</u>	<u>Date</u>
1. Connecticut Construction Industries Association, Inc.	Michael G. Moore Executive Director	2/19/80
2. City of Azusa	John R. Dangleis City Administrator	2/21/80
3. Oregon Concrete & Aggregate Producers Association, Inc.	A.G. Heizenrader Managing Director	2/21/80
4. Mississippi Concrete Industries Association	G.B. "Red" Beard Executive Director	2/22/80
5. Georgia Mining Association	Steven E. McWilliams, CAE Executive Vice President	2/22/80
6. Rio Blanco Oil Shale Company	J.B. Miller President	2/26/80
7. State of South Carolina Land Resources Conservation Commission	F.G. Scurry, Director Division of Mining & Reclamation	2/26/80
8. Ottawa Silica Company	C.S. Lekowski General Manager of Operations	2/27/80
9. Occidental Minerals Corporation	J.R. Muhm, Director Government Affairs	2/27/80
10. Cities Service Company Minerals Group	C.T. Brown Vice-President, Metals	2/28/80
11. Manasota - 88	Gloria C. Rains Chairman	3/3/80
12. Arizona Rock Products Association	Robert B. Showers Executive Director	3/5/80
13. J.R. Simplot Company	Robert V. Kimball Senior Geologist	3/5/80
14. State of Florida Department of Natural Resources	C.W. Hendry, Jr. Chief and State Geologist	3/5/80
15. Harbison-Walker Refractories	George M. Anderson Western District Manager of Mines	3/6/80
16. Maryland Aggregates Association Inc.	Richard H. Bowden President	3/6/80
17. Martin Marietta Cement	J.T. Keim Chief Mining Engineer	3/10/80
18. Tennessee Crushed Stone Association	Bradford Miller Executive Director	3/10/80
19. Ohio Department of Natural Resources	Robert W. Teater Director	3/11/80
20. State of New Mexico Energy and Minerals Department	Emery C. Arnold, Director Energy & Minerals Division	3/11/80

21. Interstate Mining Compact Commission	Kenes C. Bowling Executive Director	3/11/80
22. State of Maryland, Department of Natural Resources, Water Resources Administration	Timothy J. Schmidt Project Geologist	3/12/80
23. State of California Department of Conservation	Douglas W. Sprague Special Representative	3/12/80
24. Loncalo Phosphate Company	J.H. Hill President	3/12/80
25. The France Stone Company	Michael J. Staudohar Environmental Engineer	3/12/80
26. United States Environmental Protection Agency	Leonard A. Miller, Acting Deputy Assistant Administrator for Water Enforcement	3/13/80
27. Commonwealth of Virginia Office of the Governor	Maurice B. Rowe Secretary of Commerce & Resources	3/13/80
28. National Limestone Institute Inc.	Robert M. Koch President	3/13/80
29. Pickitt & Schreur Division Rieth-Riley Construction Co., Inc.	Raymond E. Daily	3/13/80
30. Railroad Commission of Texas	Mack Wallace Commissioner	3/13/80
31. Brick Institute of America	Thomas F. Gibson, Director Government Relations	3/14/80
32. Harbison-Walker Refractories	M.H. McDonald Manager - Mining	3/14/80
33. Iowa Limestone Producers Association, Inc.	Kenneth W. McNichols Executive Director	3/14/80
34. Babcock & Wilcox	R.P. Stuntz Vice President	3/14/80
35. Florida Audubon Society	Archie Carr, III, Ph.D. Scientific Assistant to the President	3/14/80
36. CF & I Steel Corporation Mines and Quarries	James G. Wark Manager	3/14/80
37. California Legislature - Senate	John A. Nejedly Senator, 7th District	3/17/80
38. Texas Mining & Reclamation Association	Dan Harper, Chairman Board of Directors	3/17/80
39. The Standard Oil Company	R.E. Farrell, Director Environmental Affairs & Product Safety	3/17/80
40. National Audubon Society	Robert K. Turner Regional Representative	3/17/80
41. General Refractories Company	G.P. Jones Mining Engineer	3/17/80
42. Pennsylvania Ready Mixed Concrete Association	Kenneth E. Mayer Executive Secretary	3/17/80

43. National Wildlife Federation	Robert J. Golten Counsel	3/18/80
44. Western Pennsylvania Aggregates	Francis B. Janaszek President	3/18/80
45. United States Steel Corporation	C.W. Niemi General Superintendent	3/18/80
46. The Ohio Aggregates Association	Robert A. Wilkinson Managing Director	3/18/80
47. White River Shale Project	Rees C. Madsen Manager	3/18/80
48. United States Department of the Interior Fish & Wildlife Service	Associate Director - Environment	3/19/80
49. Harbison-Walker Refractories	William G. Wentz Manager - Mining Operations Central District Mines	3/19/80
50. A.P. Green Refractories Co.	Charles E. Stock Chief Geologist	3/19/80
51. Standard Oil Company (Indiana)	J.A. Lamping Director, Ecology	3/19/80
52. Ohio River Sand & Gravel	James Murphy Vice President & General Manager	3/19/80
53. Chevron Shale Oil Company	R.F. Schlecht President	3/19/80
54. Brohard Mining & Development, Inc.	C.E. Brohard President	3/19/80
55. Noranda Exploration, Inc.	Mary Ann Nichols, Manager Governmental/Public Relations	3/19/80
56. Idaho Mining Association	Jack G. Peterson Executive Director	3/19/80
57. Utah International Inc.	J.L. Balzer, Ph.D. Director, Environmental Quality	3/20/80
58. Conquista Project	H.D. Harper Project Manager	3/20/80
59. The Standard Slag Company	Joel H. Beeghly, Manager Environmental Control	3/20/80
60. North American Refractories Co.	Edwin R. Swanson, Manager of Mines Eastern Div. Mining Dept.	3/20/80
61. North American Refractories Co.	Walton H. Clevenger, Manager of Mines, Western Div. Mining Dept.	3/20/80
62. The Milwhite Co., Inc.	Daniel A. Miller Chief Engineer	3/20/80
63. Vulcan Materials Company	E.L. Boyd President	3/20/80
64. Sierra Club, The Florida Chapter	Julie Morris Conservation Chair	3/20/80
65. Dravo	Charles R. Cox Vice President, Aggregates	3/20/80

66. Pennsylvania Aggregates Association	Park R. Trullinger, Jr.	3/20/80
67. New Riverside Ochre Co.	Joel Ross Safety Director	3/21/80
68. NL Baroid	Randy L. Weingart Mine Superintendent	3/21/80
69. State of California - Resources Agency Department of Conservation	Priscilla C. Grew Director	3/21/80
70. Georgia Mining Association	Steven E. McWilliams, CAE Executive Vice President	3/21/80
71. State of Colorado Mined Land Reclamation	Hamlet J. Barry, III Director	3/21/80
72. American Lung Association of Michigan	John C. Dembach Staff Attorney	3/21/80
73. Illinois Association of Aggregate Producers	George E. Dirkes Executive Director	3/5/80?
74. Michigan Minerals Resources Assn., Inc.	R. E. Thomason Environmental Services Manager	2/26/80
75. Occidental Oil Shale, Inc.	Jay Rachels	3/3/80
76. Thiele Kaolin Company	Thomas K. Shea, Chief of Mine Safety Section	3/19/80
77. State of N.J. Dept. of Labor & Industry	Robert H. Twiss Chairman	3/24/80
78. State Mining & Geology Board, Calif.	D. Everett Morgan Secretary-Treasurer	3/25/80
79. Cedar Heights Clay Company	Arnold A. Alekna, Vice Pres Technical Service	3/26/80
80. Martin Marietta Aggregates	Charles L. Boothby Executive Secretary	3/27/80
81. National Association of Conservation Districts	Roy N. Gamse, Deputy Assistant Administrator for Planning & Eval.	3/28/80
82. U.S. Environmental Protection Agency	Steffen Plehn, Deputy Assistant Administrator for Solid Waste	3/31/80
83. U.S. Environmental Protection Agency Office of Water & Waste Management	Cindi Gorshow Associate Director	4/7/80
84. Rocky Mountain Oil & Gas Association, Inc.	William E. Hole, Jr. President	4/9/80
85. American Aggregates Corp.	Jack C. Schmidt Earth Resources Consultant	4/10/80
86. Jack C. Schmidt	E.R. Bingham President	4/11/80
87. AMAX Environmental Services, Inc.	Carleton B. Scott Director, Environmental Sciences	4/11/80
88. Union Oil Company of California	Allen C. Randle Manager Retort Operations	4/11/80
89. Union Synthe Fuels Union Oil Company of California	C.F. Poeppelman President	4/11/80
90. C.F. Poeppelman		

3. Colorado Sand & Gravel Producers Assoc.	James D. Sells	
	Assistant Director	4/11/80
4. Natural Resources Defense Council, Inc.	Georgia Yuan	
	Project Geologist	4/11/80
5. Sierra Club		4/11/80
4. Material Service Corp.	Arvid Tienon	
	Vice President	4/14/80
5. American Mining Congress	J. Allen Overton, Jr.	
	President	4/14/80
6. National Wildlife Federation		4/15/80
7. Union Oil Company of California	Carleton B. Scott	
	Director, Environmental Sciences	4/15/80
8. Cities Service Company	Herman Firtschen	
	Manager, Environmental Affairs	4/15/80
99. Southwest Research & Information Center	Wm. Paul Robinson	
	Environmental Analyst	4/15/80
00. Friends of the Earth		
101. The China Clay Producers	Gordon O. Pehrson, Jr.	4/15/80

END

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